CLAIMS

What is claimed is:

1   1.   In a virtual private network that provides voice and data communications, the

2   virtual private network including a first private network and a second private

3   network connected by a first communication network that is capable of supporting

4   voice communications and is incapable of supporting at least one advanced voice

5   communication feature that is supported by the first private network and the

6   second private network, a method of providing the advanced voice

7   communication feature for a call from the first private network to the second

8   private network, the method comprising the steps of:

9   establishing a connection between the first private network and the second private

10   network through an auxiliary communication network that is capable of

11   supporting the advanced voice communication feature;

12   determining that a signaling message from the first private network invokes the

13   advanced voice communication feature;

14   converting the signaling message in a first protocol to a second signaling message

15   in a second protocol that is capable of handling messages that can pass

16   enough information to implement the advanced voice communication

17   feature; and

18   transmitting the second signaling message between the first private network and

19   the second private network through the auxiliary communication network.

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1 2. The method of claim 1, wherein the auxiliary communication network is capable
2   of supporting voice communications and data communications.

1 3. The method of claim 1, wherein the first communication network is a public
2   switched telephone network.

1 4. The method of claim 1, wherein the first communication network is capable of
2   supporting data communications.

1 5. The method of claim 1, further comprising the step of:
2   prior to establishing the connection between the first private network and the
3   second private network through an auxiliary communication network,
4   establishing a connection between the first private network and the second
5   private network through the first communication network; and
6   wherein the connection between the first private network and the second private
7   network through an auxiliary communication network is established from
8   the second private network in response to establishing the connection
9   between the first private network and the second private network through
10   the first communication network.

1 6. The method of claim 1, wherein the step of establishing a connection between the
2   first private network and the second private network through an auxiliary
3   communication network includes establishing the connection in response to
4   determining that a signaling message from the first private network invokes the
5   advanced voice communication feature.

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1   7.   The method of claim 1, further comprising the step of:

2   intercepting, from the first private network, the signaling message that invokes the

3   advanced voice communication feature, wherein the first private network

4   is the private network from which the call originates.

1   8.   The method of claim 1, further comprising the step of:

2   intercepting, from the second private network, the signaling message that invokes

3   the advanced voice communication feature, wherein the second private

4   network is the private network at which the call terminates.

1   9.   The method of claim 1, wherein the advanced voice communication feature is a

2   custom calling feature from a group consisting of call-waiting, call-forwarding,

3   and three-way-calling.

1   10.   An apparatus that interconnects a first private network to a second private

2   network through a first communication network that is capable of supporting

3   voice communications and is incapable of supporting at least one advanced voice

4   communication feature that is supported by the first private network and the

5   second private network, and that interconnects the first private network to the

6   second private network through a second communication network that is capable

7   of supporting voice communications and data communications and is capable of

8   supporting the at least one advanced voice communication feature that is

9   supported by the first private network and the second private network, the

10   apparatus comprising:

11   a first communications interface coupled between the first private network and the

12   first communication network so as to communicate information

13   therebetween;

14   a second communications interface coupled between the first private network and

15   the second network so as to communicate messages in a protocol that is

16   capable of handling messages that can pass enough information to

17   implement the advanced voice communication feature;

18   a processor coupled to the first communications interface and the second

19   communications interface; and

20   a memory coupled to the processor, the memory comprising one or more

21   instructions which, when executed by the processor, cause the processor to

22   perform the steps of:

23   establishing a connection between the first private network and the second

24   private network through the second communication network;

25   determining that a signaling message from the first private network

26   invokes the advanced voice communication feature;

27   converting the signaling message in a first protocol to a second signaling

28   message in the protocol that is capable of handling messages that

29   can pass enough information to implement the advanced voice

30   communication feature; and

31   transmitting the second signaling message between the first private

32   network and the second private network through the second

33   communication network.

1   11.   The apparatus of claim 10, wherein the first communication network is a public

2   telephone network.

1   12.   The apparatus of claim 10, wherein the first communication network is capable of

2   supporting data communications.

1   13.   The apparatus of claim 10, wherein the instructions cause the processor to

2   perform the step of:

3   prior to establishing the connection between the first private network and the

4   second private network through the second communication network,

5   establishing a connection between the first private network and the second

6   private network through the first communication network; and

7   wherein the connection between the first private network and the second private

8   network through the second communication network is established from

9   the second private network in response to establishing the connection

10   between the first private network and the second private network through

11   the first communication network.

1   14.   The apparatus of claim 10, wherein the step of establishing a connection between

2   the first private network and the second private network through the second

3   communication network includes establishing the connection in response to

4   determining that a signaling message from the first private network invokes the

5   advanced voice communication feature.

1   15.   The apparatus of claim 10, wherein the instructions cause the processor to

2   perform the step of:

3   intercepting, from the first private network, the signaling message that invokes the

4   advanced voice communication feature, wherein the first private network

5   is the private network from which the call originates.

1   16.   The apparatus of claim 10, wherein the instructions cause the processor to

2   perform the step of:

3   intercepting, from the second private network, the signaling message that invokes

4   the advanced voice communication feature, wherein the second private

5   network is the private network at which the call terminates.

1   17.   The apparatus of claim 10, wherein the advanced voice communication feature is

2   a custom calling feature from a group consisting of call-waiting, call-forwarding,

3   and three-way-calling.

1   18.   A computer-readable medium carrying one or more sequences of instructions for

2   providing an advanced voice communication feature for a call from a first private

3   network to a second private network that is interconnected to the first private

4   network through a first communication network that is capable of supporting

5   voice communications and is incapable of supporting at least one advanced voice

6   communication feature that is supported by the first private network and the

7   second private network and that is interconnected to the first private network

8   through a second communication network that is capable of supporting voice

9   communications and data communications and is capable of supporting the at

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10   least one advanced voice communication feature that is supported by the first

11   private network and the second private network, which instructions, when

12   executed by one or more processors, cause the one or more processors to carry out

13   the steps of:

14   establishing a connection between the first private network and the second private

15   network through the second communication network;

16   determining that a signaling message from the first private network invokes the

17   advanced voice communication feature;

18   converting the signaling message in a first protocol to a second signaling message

19   in the protocol that is capable of handling messages that can pass enough

20   information to implement the advanced voice communication feature; and

21   transmitting the second signaling message between the first private network and

22   the second private network through the second communication network.

1   19. The computer-readable of claim 18, wherein the first communication network is a

2   public telephone network.

1   20. The computer-readable of claim 18, wherein the first communication network is

2   capable of supporting data communications.

1   21. The computer-readable of claim 18, wherein the instructions cause the one or

2   more processors to carry out the step of:

3   prior to establishing the connection between the first private network and the

4   second private network through the second communication network,

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5   establishing a connection between the first private network and the second

6   private network through the first communication network; and

7   wherein the connection between the first private network and the second private

8   network through the second communication network is established from

9   the second private network in response to establishing the connection

10   between the first private network and the second private network through

11   the first communication network.

1   22.   The computer-readable of claim 18, wherein the step of establishing a connection

2   between the first private network and the second private network through the

3   second communication network includes establishing the connection in response

4   to determining that a signaling message from the first private network invokes the

5   advanced voice communication feature.

1   23.   The computer-readable of claim 18, wherein the instructions cause the one or

2   more processors to carry out the step of:

3   intercepting, from the first private network, the signaling message that invokes the

4   advanced voice communication feature, wherein the first private network

5   is the private network from which the call originates.

1   24.   The computer-readable of claim 18, wherein the instructions cause the one or

2   more processors to carry out the step of:

3   intercepting, from the second private network, the signaling message that invokes

4   the advanced voice communication feature, wherein the second private

5   network is the private network at which the call terminates.

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1   25.   The computer-readable of claim 18, wherein the advanced voice communication

2   feature is a custom calling feature from a group consisting of call-waiting, call-

3   forwarding, and three-way-calling.

1   26.   An apparatus that interconnects a first private network to a second private

2   network through a first communication network that is capable of supporting

3   voice communications and is incapable of supporting at least one advanced voice

4   communication feature that is supported by the first private network and the

5   second private network, and that interconnects the first private network to the

6   second private network through a second communication network that is capable

7   of supporting voice communications and data communications and is capable of

8   supporting the at least one advanced voice communication feature that is

9   supported by the first private network and the second private network, the

10   apparatus comprising:

11   means for establishing a connection between the first private network and the

12   second private network through the second communication network;

13   means for determining that a signaling message from the first private network

14   invokes the advanced voice communication feature;

15   means for converting the signaling message in a first protocol to a second

16   signaling message in the protocol that is capable of handling messages that

17   can pass enough information to implement the advanced voice

18   communication feature; and

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19   means for transmitting the second signaling message between the first private

20   network and the second private network through the second

21   communication network.

1   27.   A system comprising:

2   a first private network that is capable of supporting an advanced voice

3   communication feature;

4   a first protocol converter coupled to the first private network;

5   a first communication network coupled to the first protocol converter and

6   employing a protocol that is incapable of supporting the advanced voice

7   communication feature;

8   a second protocol converter coupled to the first communication network;

9   a second private network that is capable of supporting the advanced voice

10   communication feature and supporting data communications and that is

11   coupled to the second protocol converter; and

12   a second communication network that is capable of supporting the advanced voice

13   communication feature and that is coupled to the first protocol converter

14   and the second protocol converter, the second communication network for

15   transmitting a converted signaling message, between the first protocol

16   converter and the second protocol converter, in a protocol that is capable

17   of handling messages that can pass enough information to implement the

18   advanced voice communication feature.

19   28.   The system of claim 27, wherein the first communication network is a public

20   telephone network.

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1   29.   The system of claim 27, wherein the first communication network is capable of

2   supporting data communications.

1   30.   The system of claim 27, wherein the advanced voice communication feature is a

2   custom calling feature from a group consisting of call-waiting, call-forwarding,

3   and three-way-calling.

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